

FEDERAL - STATE COOPERATIVE
SNOW SURVEYS AND IRRIGATION WATER FORECASTS



Montana and Northern Wyoming
Upper Missouri, Upper Columbia and
Yellowstone Rivers

By
Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and

Montana Agricultural Experiment Station

In cooperation with the U. S. Forest Service, U. S. Geological Survey, National
Park Service, U. S. Bureau of Reclamation, State Engineers of Montana and
Wyoming and other Federal, State and local organizations.

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As of

MAY 1, 1953



UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY
AND WATER SUPPLY FORECAST REPORTS:

Forecasts by U. S. Weather Bureau of total annual streamflow October-September, inclusive, at more than 300 gaging stations are issued monthly January through May in the publication WATER SUPPLY FORECASTS FOR THE WESTERN UNITED STATES.

Weather Bureau forecasts of runoff presented in this bulletin are computed from procedures based on mathematical analysis of the relation between precipitation and runoff.

The Weather Bureau bulletins may be secured by writing to:

Hydrologist in Charge
River Forecast Center
U. S. Weather Bureau
712 Federal Office Building
Kansas City 6, Missouri

FEDERAL--STATE COOPERATIVE SNOW SURVEYS

AND

IRRIGATION WATER FORECASTS

FOR

MONTANA AND NORTHERN WYOMING

Upper Missouri and Upper Columbia River
Basins

Report Prepared
by

Ashton R. Codd: Hydraulic Engineer
Soil Conservation Service

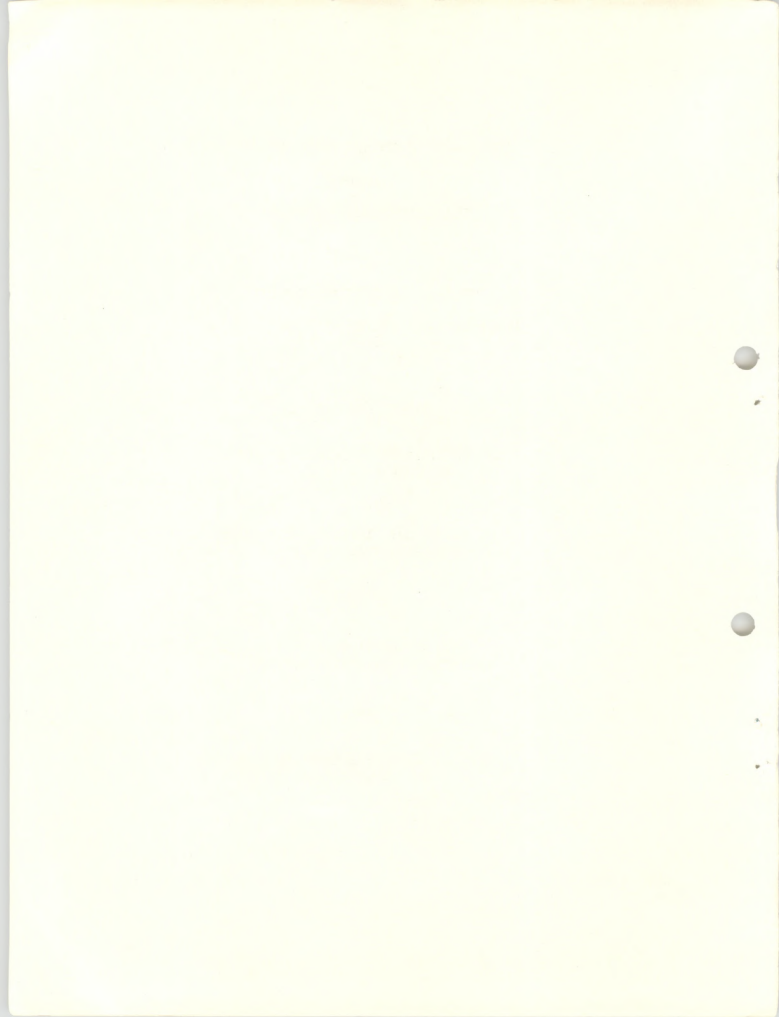
and

O. W. Monson: Irrigation Engineer
Montana Agricultural Experiment Station

Division of Irrigation
Soil Conservation Service

and

Montana Agricultural Experiment Station
Bozeman, Montana



IRRIGATION WATER SUPPLY OUTLOOK
FOR SEASON 1953
AS OF MAY 1, 1953

* Snow survey measurements made on or about May 1st over *
 * the Upper Missouri Basin indicate that the water supply for *
 * the irrigation season for 1953 is FAIR to GOOD. The snow pack *
 * at this time is rather large when compared to an average con- *
 * sisting of 20 years' record. *

* Due to the dry fall and mild winter temperatures, a *
 * considerable portion of the snow pack is disappearing into *
 * the sub-soil. A good portion of the low elevation snow has *
 * disappeared, leaving a rather small area of the water shed *
 * covered with a relatively deep snow pack. Those irrigation *
 * projects under regulated reservoirs will have a good supply *
 * this season, while those under unregulated streams will need *
 * supplemental water for late July and August irrigation. *

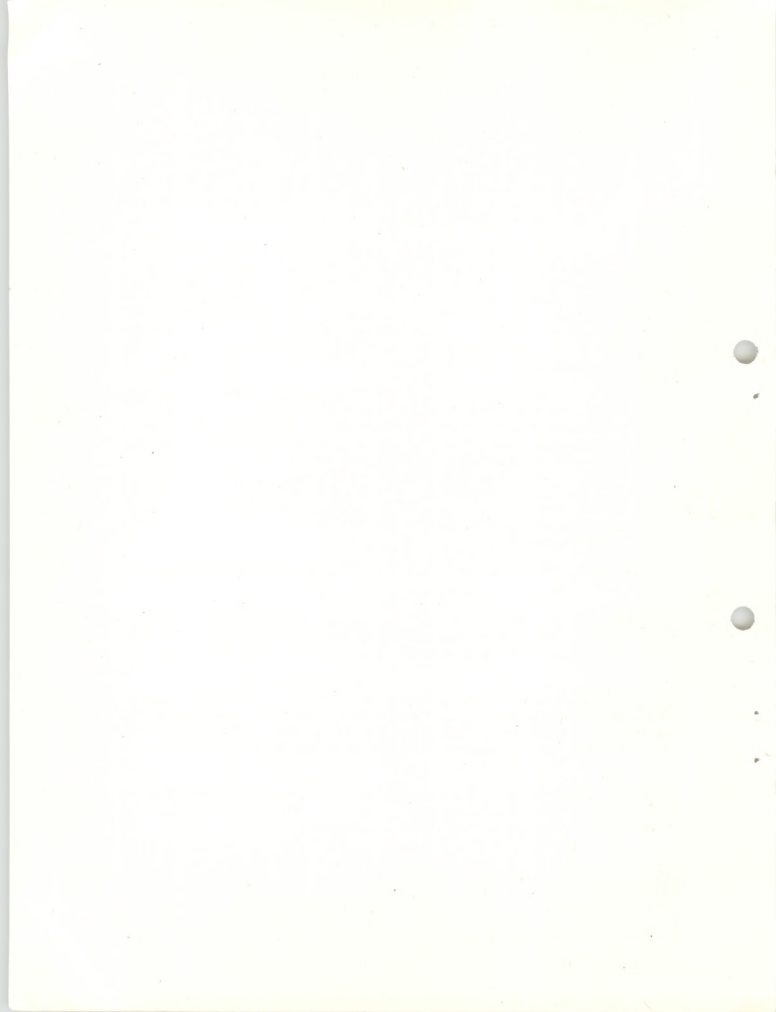
* The snow pack over the Upper Columbia Basin in Montana *
 * has increased considerably during April, and some of the *
 * courses have more water content on May 1st than was evident *
 * during the last of March. Valley precipitation stations in- *
 * dicated a definite plus departure from normal over most of *
 * this basin which necessitated raising the forecast of seasonal *
 * volume flow. Reservoir storage is approximately average for *
 * this time of year. Antecedent stream flow has been close to *
 * median in general, with a few points showing a definite below- *
 * median trend. *

JEFFERSON RIVER: Only a few snow survey courses are measured in the Jefferson River Basin on May 1st which indicates a rather normal situation in that basin. The forecast for this basin was not raised over the April figures.

MADISON RIVER: On the Madison River, the May 1st snow surveys showed a little better than average conditions for May 1st. The snow line is remarkably high, and the area to contribute to runoff will be relatively smaller than last season, even though we have a large water content in the higher elevations.

GALLATIN RIVER: Snow survey measurements made on May 1st indicate relatively the same trend as those on the Madison. The river forecasts for these two streams were raised slightly over the April 1st figure.

MISSOURI RIVER MAIN STEM: The Missouri River main stem below Three Forks will carry a good supply of water during the coming season. The water content on the snow survey courses above Helena and at Marias Pass indicate a good water content, although a very high snow line. Stream flow forecasts at Toston and Fort Benton have been raised slightly due to a plus departure in precipitation over this basin.



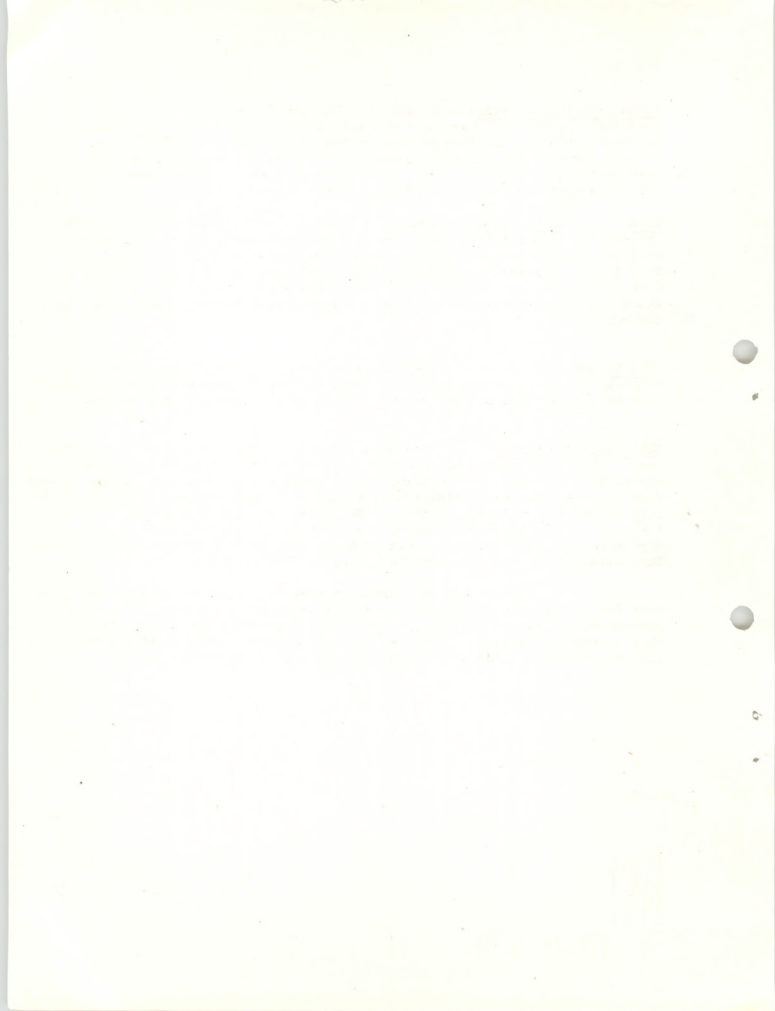
UPPER YELLOWSTONE RIVER: The snow pack in Yellowstone Park on May 1st is good for this time of year, although not as high in percentage of average as snow survey courses further west in the Missouri Basin. The stream flow at Corwin Springs for April-September was raised approximately 300,000 acre feet. It is now anticipated that approximately 2,000,000 acre feet will pass that station between April 1st and September 30th.

LOWER YELLOWSTONE RIVER (In Wyoming): The snow pack on the Popo Agie River on April 1st was slightly below average, and it is anticipated that there will be an early runoff of rather a small volume. The forecasts for the Popo Agie are approximately the same as April 1st, due to a plus departure from normal of precipitation over most of the basin. It is anticipated that above normal precipitation during May and June will produce about normal runoff conditions.

WIND RIVER: May 1st snow surveys made on the Wind River Basin above Dubois indicate a fair water supply during April-September from this stream. Revised forecasts would indicate approximately 110% of average flow at Riverton.

COLUMBIA RIVER BASIN: The 1953 snow pack as measured on May 1st in the Flathead Basin has increased at some stations, while the snow line has raised in elevation. The basin now contains a good water supply, and with normal May and June temperatures and precipitation, should yield approximately 6,189,000 acre feet of water from April 1st through September, or 110% of average. Although the snow line on the South Fork of the Flathead is relatively high, it is anticipated that 2,295,000 acre feet of water will be available to Hungry Horse Dam between April 1st and September 30th, or 110% average.

The Clark's Fork drainage received an above average precipitation during April, and the river forecasts were raised slightly to meet this condition. It is now anticipated that the Clark's Fork below Missoula will flow approximately 110% of average, and the combined rivers at Plains will flow approximately 113% of average during the April-September period.

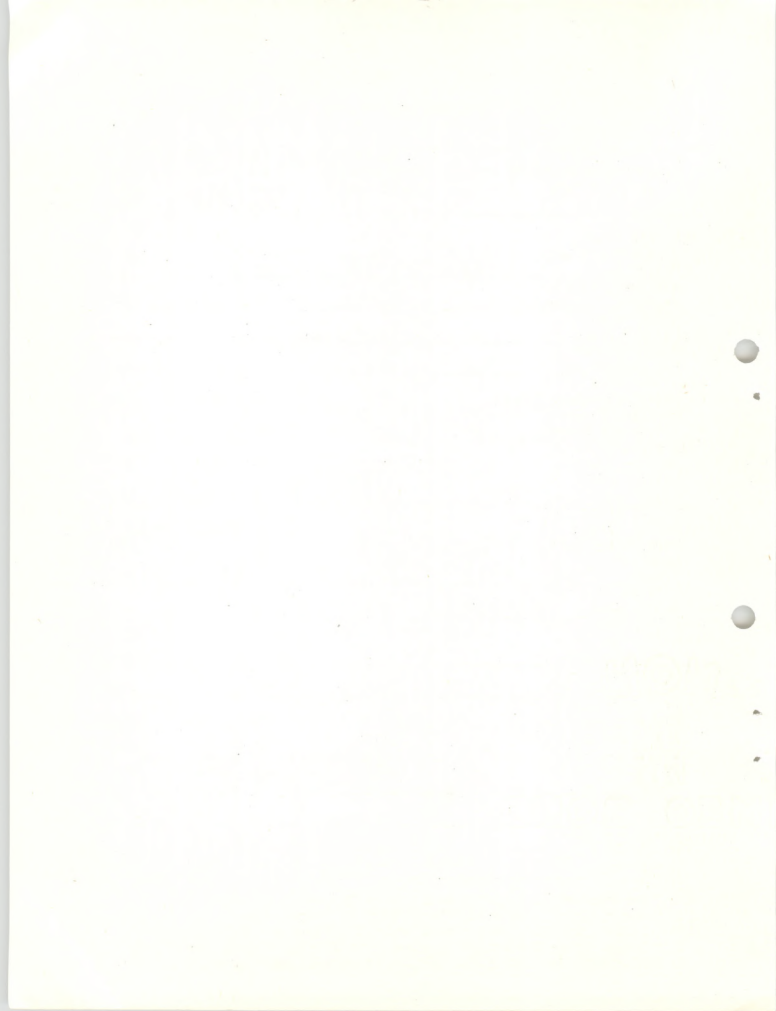


Mar 1, 1953

FORECAST OF SEASONAL STREAM FLOW

UPPER MISSOURI RIVER IN MONTANA	Seasonal Stream Flow in Thousands of acre feet				
	FORECAST-1953 April - Sept.	% A-S 10-Yr. Avg.	Measured runoff April - Sept.		10-Yr. Avg. A-S 1911-'50
RED ROCK RIVER					
Kenedy Ranch (at)	74.4	120	-	-	62
Monida (near) (1)	95.9	112	-	-	86
BEAVERHEAD RIVER					
Barretts, Montana	193	97	222	170	198
BIGHOLE RIVER					
Belrose (near)	789	131	-	861	761
JEFFERSON RIVER					
Sappington (at)	904	86	-	1,114	1,134
FADISON RIVER					
West Yellowstone (near)	195	98	248	234	199
Garryling (near) (2)	412	98	-	-	419
McAllister (near) (3)	763	104	-	-	733
GALATIEN RIVER					
Gateway (near)	435	96	596	399	454
Hyalite Creek	33.6	92	41.0	27.7	36.7
Logan (at)	455	93	745	412	421
MISSOURI RIVER					
Toston (at)	2,208	90	2,825	2,217	2,450
Fort Benton (at)	3,298	94	-	4,072	3,524
Loma	3,810	91	-	5,162	4,201
Zortman	4,090	90	-	5,524	4,564
ST. PETER RIVER					
Vaughn (at) (5)	363	91	-	-	411
MATTES RIVER					
Steeley (at)	414	81	-	-	345
Brinkman (near)	445	81	-	-	342
JUDITH RIVER					
Idaho (near)	34	77	48	40	44
YELLOWSTONE RIVER					
Corwin Springs (at)	2,000	108	2,184	2,254	1,858
Livingston (near)	2,319	107	-	2,474	2,166
Billings (at)	3,965	95	4,642	4,464	4,167
Wiles City (at)	6,617	97	6,264	7,237	6,774
Sioux (near)	6,941	97	-	7,063	7,006
SHIELD RIVER					
Wilsall (near)	43.2	98	-	32.2	44
CLARK FORK RIVER					
Chance (at)	520	88	-	731	589
Edgar (at)	556	88	613	766	620

- (1) Observed flow plus change in storage in Lima Reservoir
- (2) Observed flow plus change in storage in Hebgen Lake
- (3) Observed flow plus change in storage in Hebgen and Bonis Lakes
- (5) Observed flow plus change in storage in Gibson, Willow Creek & Fishkum Res.
- (*) Preliminary data furnished by U.S. Geological Survey, subject to revision.

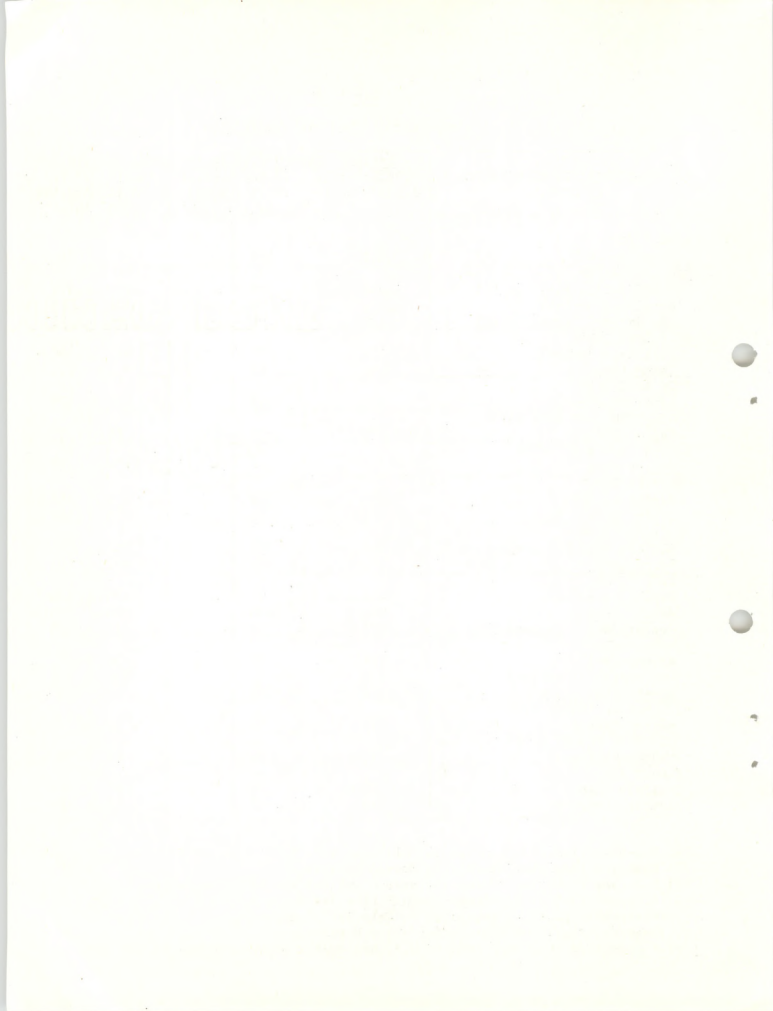


May 1, 1953

FORECAST OF SEASONAL STREAM FLOW

YELLOWSTONE RIVER TRIBUTARIES IN WYOMING	Seasonal Stream Flow in Thousands of acre feet				
	FORECAST-1953	% A-S	Measured runoff		10-Yr.
	April - Sept.	10-Yr. Avg.	April	Sept.	Avg. A-S '41-'50
WIND RIVER					
Riverton (at) (6)	640	110	-	-	534
BIG HORN RIVER					
Thermopolis, (at) (7)	960	95	-	-	1,011
Kane, (at)	1,394	94	-	1,514	1,475
St. Xavier (near) (8)	2,192	98	-	2,365	2,232
BULL LAKE CREEK					
Bull Lake (Above)	171	85		-	202
Lenor (near) (9)	159	83		-	192
POPO AGIE RIVER					
Riverton (near)	369	98		-	375
NORTH FORK POPO AGIE RIVER					
Lander (near)	72	96		87	75
LITTLE POPO AGIE RIVER					
Hudson (at)	57	100	-	-	57
GREYBULL RIVER					
Meeteetse (at)	208	87		-	238
Basin (near)	99	85		-	122
SHOSHONE RIVER					
Buffalo Bill Dam (below) (10)	811	103		862	785
Byron (at) (10)	674	112		691	601
TONGUE RIVER					
Dayton (near)	111	97		108	114
Acme (near)	265	106		206	250
Decker (near) Montana (11)	271	98		210	276
POWDER RIVER					
Arvado (at)	163	98		59	165
Moorehead (at) Montana	296	95		117	313
Locate (at) Montana	366	94		150	390
MIDDLE FORK POWDER RIVER					
Kaycee (near)	73	90		50.3	81
NORTH FORK POWDER RIVER					
Mayoworth (near)	18.8	94		12	20
CLEAR CREEK					
Buffalo (near)	38.9	97		26	40
Arvado (near)	119	90		53.4	132

- (6) Observed flow plus Storage in Bull Lake and Pilot Butte Reservoirs
 (7) Observed flow plus Storage in Boysen Reservoir
 (8) Observed flow plus Storage in Boysen and Buffalo Bill Reservoirs
 (9) Observed flow plus Storage in Bull Lake Reservoir
 (10) Observed flow plus Storage in Buffalo Bill Reservoir
 (11) Observed flow plus Storage in Tongue Reservoir
 (*) Preliminary data furnished by U.S. Geological Survey subject to revision.



May 1, 1953

FORECAST OF SEASONAL STREAM FLOW

UPPER COLUMBIA RIVER IN MONTANA	Seasonal Streamflow in Thousands of acre feet					
	FORECAST 1953		% A-S	Measured runoff		10-Yr.
	April- Sept.	April- July	10-Yr. Avg.	April 1952	Sept.* 1951	Avg.A-S '41-'50
CLARK FORK RIVER						
Bonner (above) (3)	896	810	115	-	941	781
Missoula (above)	1780	1619	109	1782	2369	1631
Missoula (below)	3363	3087	110	3268	4127	3044
St. Regis (at)	4486	4146	111	4318	5492	4042
Plains (near) (4)	12314	11341	113	9421	13302	10869
Cabinet Gorge (at) (4)	13822	12734	113	-	15178	12297
BLACKFOOT RIVER						
Bonner (near)	884	806	104	-	1295	851
BITTERROOT RIVER						
Darby (near)	609	571	110	608	663	544
At Mouth (6)	1583	-	112	1362	1618	1413
FLATHEAD RIVER						
Columbia Falls (near) No. Fk.	1754	1606	103	-	2396	1705
Columbia Falls (at) (7)	6189	5583	110	7224	5722	5604
Polson (near) (4)	7441	6843	112	4993	6363	6621
MIDDLEFORK FLATHEAD RIVER						
West Glacier (near)	1813	1697	108	-	2139	1664
SOUTH FORK FLATHEAD RIVER						
Columbia Falls (near)(7)	2295	2150	110	2058	2511	2091

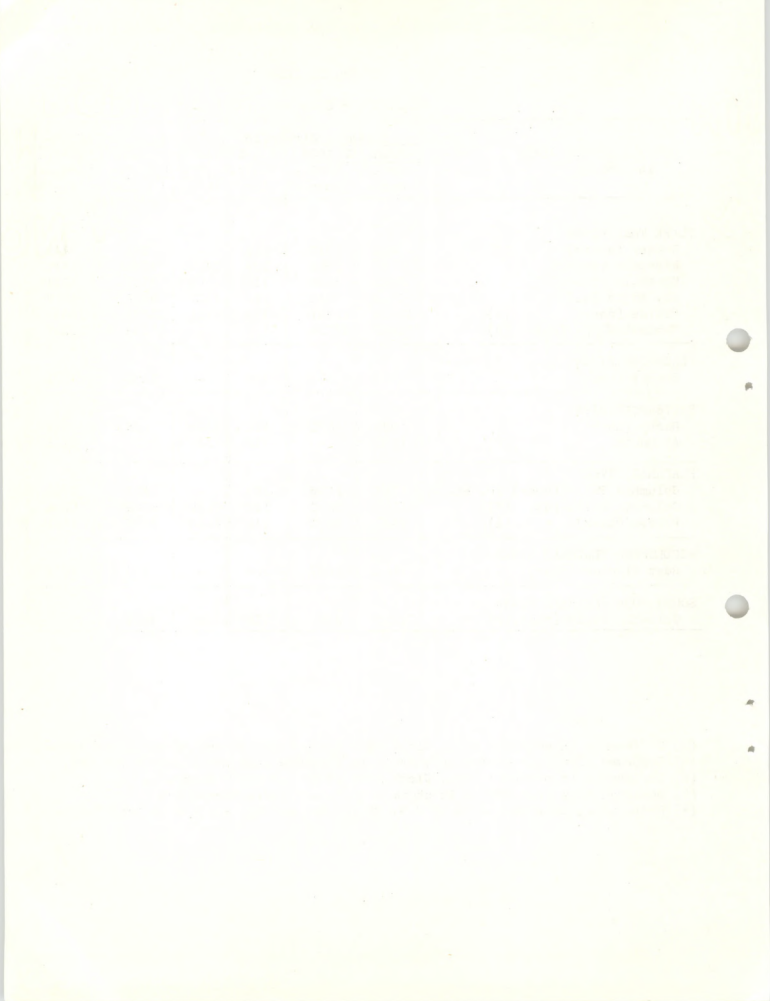
(3) Difference in observed flow, Clark Fork above Missoula and Blackfoot at Bonner.

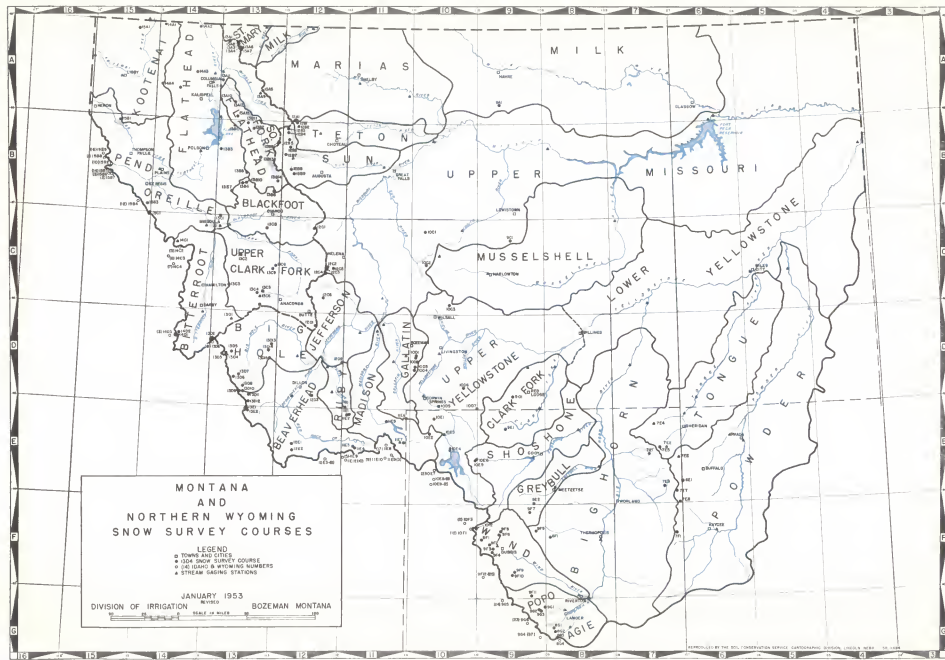
(4) Observed flow plus change in storage in Flathead Lake and Hungry Horse Res.

(6) Difference in observed flow, Clark Fork above and below Missoula.

(7) Observed flow plus change in storage in Hungry Horse Reservoir.

(*) Preliminary data furnished by U.S. Geological Survey, subject to correction.





<u>Name</u>	<u>State</u>	<u>Sec.</u>	<u>Range</u>	<u>Record</u>	<u>Measured</u>	<u>Drainage Basin and Course Name</u>	<u>Portland</u>	<u>Location</u>	<u>Record</u>	<u>Measuring Data^a</u>	<u>Measured Dist.^b</u>
<u>Number</u>	<u>Area</u>	<u>Lat.</u>	<u>Long.</u>	<u>Deg.</u>	<u>Miles</u>		<u>River</u>	<u>Sta.</u>	<u>Lat.</u>	<u>Long.</u>	<u>Feet</u>
MISSOURI RIVER DRAINAGE						MISSOURI RIVER DRAINAGE CONT.					

MISSOURI RIVER DRAINAGE CONT.

[illegible]

ROOTING THE TREE

Blue Mountain	1301	6000	1	258	118	1977	4,5	1
Blue Mountain	1301	6000	26	738	304	1977	4,5	1
Red Mountain	1301	6000	4	198	198	1977	4,5	1
Red Mountain	1301	6000	4	198	198	1977	4,5	1
Heat Creek	1304	5000	11	198	126	1991	2,3,4,5	1
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Heat Creek								

PEDO ORSILLA, 1972

Perce Fountain	1361	6000	1	258	31W	1997	4a,5	1
Peavost Summit #2	15810	6800	2	318	27W	1992	4	1
Reddon Creek	1561	6800	9A16	31W	27W	1997	4	1
PITCHER RIVER								
East Fork Hogger Sho.	1301	5100	1b	2W	17W	1997	4	1
Shilohs Pass	1532	7100	4	28	19W	1996	1a,2,3,4,5	1
East Creek Feature	1463	6500	2a	11W	20W	1997	3	1
East Perce Gap	1168	5900	10A80	15	23W	1997	4	1
Seagarden Pass	1161	6175	3	30W	3	1997	4	1
Shilohs Summit	1563	7550	30	6W	17W	1997	4	1

ST. MARY RIVER

Wagner Pass 1A	1943	6000	100-100'	113°-14'	1902	5	2,0
Wagner Pass 1B	1943	1000	100-100'	113°-14'	1902	5	2,0
Wagner Pass 1C	1946	6000	100-100'	113°-14'	1902	5	2,0
Wagner Pass 1D	1947	1000	100-100'	113°-14'	1902	5	2,0
Wagner Pass 1E	1948	5000	100-100'	113°-14'	1902	5	2,0

Notes: 1, 2, 3, 4, and 5 refer to January 1, February 1, March 1, April 1, and May 1.

Notes: Refer to Agency that assesses the snow cover as follows:

1. U.S. Forest Service
2. U.S. Geological Survey and U.S. Engineer Corps
3. Fish and Wildlife Service
4. U.S. Indian Service
5. National Park Service
6. Wildlife Experiment Station
7. City of Bureau
8. Seattle Water and Power Bureau
9. Plan and Middle River State
10. Forest of Washington
11. Bureau of Reclamation
12. National Park Service
13. Soil Conservation Service
14. National Game Warden

U.S. GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

WASHINGTON FIELD OFFICE

8-3-53

a. Months 1, 2, 3, 4, and 5 refer to January 1, February 1, March 1, April 1, and May 1

b. Numerals refer to Agency that secures the good survey as follows:

1. U.S. Forest Service
2. U.S. Geological Survey and U.S. Engineer Corps
3. Western Power Company
4. U.S. Indian Service
5. National Park Service
6. Montana Experiment Station
7. City of Bozeman
8. Dominion Water and Power Bureau
9. U.S. Fish and Wildlife Service
10. U.S. Bureau of Reclamation
11. Geographic Names Committee
12. Soil Conservation Service
13. Montana State Forestry School

3.8-11.4664

STORAGE IN RESERVOIRS OF MONTANA - May 1, 1953
MISSOURI RIVER BASIN - MONTANA

RESERVOIR	Location on or diversion from	Usable Capacity	Reservoir Volumes in 1,000's a.f.				
			1953	1952	1951	1950	10-yr. average 1943 - 1952
Lima Reservoir	Beaverhead	84.00		62.45	72.02	69.54	67.03
Ruby Reservoir	Ruby River	38.85					
Willow Creek Reser.	Willow Creek	17.76					
Hebgen Lake	Madison River	345.00	203.3	205.2	261.3	231.4	220.5
Ennis Lake	Madison River	41.00	33.39	38.35	29.89	32.78	35.03
Middle Creek Reser.	Hyalite Creek		5.48				
Lake Sewall	Missouri River		80.52	26.42	20.47	12.24	26.19
Hauser Lake	Missouri River	62.50	51.87	34.64	52.93	36.73	43.13
Lake Helena	Missouri River	10.45	6.86	2.24	7.20	2.70	6.81
Holter Lake	Missouri River	81.92	36.61	57.80	56.51	68.03	57.78
Gibson Reservoir	N.Fk. Sun River	105.00	73.89	92.57	81.71	52.51	73.22
Willow Creek Res.	N.Fk. Sun River	32.30	28.18	26.82	27.09	5.89	18.28
Pishkun Reservoir	N.Fk. Sun River	32.00	19.94	23.48	19.04	24.66	20.46
Bynum Reservoir	Teton River						
Lower Two Medicine Lake	Two Medicine River	14.00		0	0	0	2.10
Four Horns Lake	Badger Creek	20.00		7.66	8.58	6.36	8.08
Swift Reservoir	Birch Creek	30.00	21.98	30.19	30.20	24.89	28.01
Lake Francis	Dupuyer & Birch Cr.	112.00	101.40	98.80	102.20	91.42	102.20
Ackley Lake	Judith River	5.82		4.87	4.81	4.36	4.80
Durand Reservoir	N.Fk.Musselshell	7.01	5.17		7.03	7.03	
Martinsdale Reservoir	S.Fk.Musselshell	23.10	12.68		14.23	13.73	
Deadman Basin "	Musselshell River	52.50				52.00	
Fort Peck Reservoir	Missouri River	19,000.00	12,630.0	13,630.0	13,400.0	12,540.0	12,512.0
Fresno Reservoir	Milk River	127.20	97.49	148.50	132.50	60.94	96.98
Nelson Reservoir	Milk River	66.80	36.66	40.28	18.49	13.40	31.84
Mystic Lake	W.Rosebud Creek	20.80	4.84	2.87	1.21	0.579	3.34
Cooney Reservoir	Red Lodge Creek	27.50		18.34	16.51	18.98	13.71
Tongue River Reser.	Tongue River	73.90	22.14	30.11	14.98	15.10	17.31
Sherburne Lake	Swiftcurrent Cr.	66.10			39.94	34.08	

YELLOWSTONE RIVER BASIN - Wyoming

Buffalo Bill Reservoir	Shoshone River	456.60		233.7	236.2	164.3	278.6
Boysen Reservoir	Wind River	819.80		233.4			
Pilot Butte Reservoir	Wind River	30.10		19.1	21.0	19.9	205.6
Bull Lake Reservoir	Wind River (Bull Creek)	155.00		33.9	71.5	6.8	51.6



STORAGE IN RESERVOIRS OF MONTANA - May 1, 1953

COLUMBIA RIVER BASIN

RESERVOIR	Location on or diversion from	Usable Capacity	Reservoir Volumes in 1,000's a.f.				
			1953	1952	1951	1950	10-yr. average 1943 - 1952
Georgetown Lake	Flint Creek	31.00	23.80	21.58	21.41	19.04	21.68
E.Fk. Creek Res.	E.Fk. Rock Creek	16.04					
Nevada Creek Res.	Nevada Creek	12.60					
W.Fk. Bitterroot Res.	W.Fk. Bitterroot	31.70					
Como Lake	Rock Creek	34.80			20.50	19.00	
Hungry Horse Res.	So. Fk. Flathead Riv.	3,500.00	898.4	216.7			
Flathead Lake	Flathead River	1,791.00	777.9	1212.0	990.6	829.3	991.9
Little Bitterroot	Little Bitterroot*	36.10	31.64	36.12	32.56	36.12	21.77
Dry Fork Reservoir	Dry Fork Creek*	6.70	5.58	6.41	5.82	6.02	48.00
Mission Valley Res.	Flathead Irr. Proj.**	98.60	43.44	67.17	58.84	32.66	48.94
Lower Jocko Lake	Jocko Creek	7.6	0.245	2.58			

* Sum of two reservoirs on Little Bitterroot

* Sum of two reservoirs on Dry Fork Creek

** Sum of (8) eight reservoirs on Project



PRECIPITATION DATA FOR APRIL 30, 1953
MONTANA

Station	Elevation	1952			1953				Dept. from Normal	Accumulated Precipitation				
		Current Oct.	Precipitation Nov.	Dec.	Jan.	Feb.	Mar.	Apr.		1952-53	Normal	Departure		
WEST OF DIVIDE														
Fortine	3000	.05	.28	.87	2.96	.71	0.90	2.29	+1.30	8.06	8.99	- .93		
Butte (Airport)	5533	.06	.75	.24	.73	1.03	0.45	1.36	+0.30	3.99	4.19	- .20		
Phillipsburg	5280	T	1.07	.28	1.27	.94	0.56	0.91	-0.34	5.03	6.28	-1.25		
Hamilton	3529	.11	.64	.27	1.60	.35	0.42	0.21	-0.66	3.60	5.53	-1.93		
West Glacier	3154	.08	.86	2.43	7.07	3.24	1.62	3.19	+1.69	18.30	16.61	+1.69		
Summit (Marías)	5213	.75	1.63	3.12	14.00	4.50	3.20	5.78	+3.50	32.98	19.82	+13.16		
Ovando 1 SW	4101	.13	.65	1.16	3.02	1.40	0.24	0.62	-0.33	7.22	9.66	-2.44		
Trout Creek	2485	.26	.37	3.42	13.14	3.29	1.37	2.76	+1.08	24.61	21.45	+3.16		
Thompson Falls	2435	.13	.38	1.03	7.30	1.96	0.48	2.05	+0.61	13.33	13.01	+0.32		
Average (9)		.17	.72	1.42	5.68	1.93	1.03	2.37	+1.03	13.01	12.50	+0.51		
CENTRAL DIVISION														
Babb	4300	.14	.96	.08	2.24	1.53	1.52	3.56	+1.94	10.87	7.64	+3.23		
Havre	2488	.01	.42	.12	.26	.58	0.45	1.53	+0.54	3.37	4.62	-1.25		
Great Falls(Airport)	3664	.16	1.36	.08	.55	1.46	0.74	1.85	+0.70	6.20	5.38	+0.82		
Helena (Airport)	3893	.35	1.05	.28	.51	1.02	0.22	0.83	-0.29	4.26	4.39	-0.13		
Lewistown (Airport)	4132	.37	.65	.08	.44	.79	0.31	1.36	+0.09	4.00	4.57	-0.57		
Livingston	4485	.18	.52	.18	.50	.77	0.56	1.83	+0.51	4.54	5.83	-1.29		
Wisdom	6058	.13	.35	.43	1.46	1.19	0.54	1.63	+0.52	6.29	5.67	+0.72		
West Yellowstone	6669	.13	.68	2.23	2.20	2.05	1.65	0.94	-0.90	9.86	14.56	-4.70		
Mystic Lake	6558	.19	1.48	.47	1.60	2.04	1.34	4.28	+1.54	11.40	11.47	-0.07		
Average (9)		.17	.83	.44	1.08	1.38	0.70	1.98	+0.52	6.75	7.12	-0.37		
EASTERN DIVISION														
Malta	2255	.01	.18	.26	.50	.52	0.73	2.09	+1.29	4.29	3.78	+0.51		
Ft. Peck	2180	T	.04	.11	.21	.67	0.28	1.54	+0.46	2.85	3.73	-0.88		
Medicine Lake	1962	.11	.10	.08	.70	.07	0.14	1.73	+0.84	2.93	3.29	-0.36		
Circle	2428	.03	.17	T	.11	.25	0.23	1.59	+0.45	3.61	5.59	-1.98		
Billings #2	3139	.47	.32	.15	.36	.47	0.45	0.93	-0.37	3.17	5.74	-2.57		
Miles City	2392	.01	.61	.11	.70	.48	0.68	2.52	+1.40	5.11	5.23	-0.12		
Glendive	2076	.02	.58	.05	.17	.36	0.66	2.28	+1.16	4.12	4.71	-0.59		
Broadus	3026	.44	T	.06	.85	.53	0.42	1.91	+0.38	3.81	5.29	-1.48		
Average (8)		.08	.25	.10	.45	.42	0.49	1.82	+0.22	3.74	4.67	-0.93		



PRECIPITATION DATA FOR April 30, 1953
NORTHERN WYOMING

Station	Elev- ation	1952				1953				Dept. from Normal	Accumulated Precipitation		
		Current Precipitation									1952-53	Normal	Departure
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.					
<u>BIG HORN RIVER BASIN</u>													
Cody	4984	.03	.21	.02	.14	.97	0.18	2.79	+1.76	4.34	3.72	+0.62	
Lovell	3825	.00	.19	.11	.12	.18	0.30	0.54	-0.06	1.44	2.84	-1.40	
Worland	4061	.00	.16	.08	.28	.40	0.40	1.53	+0.53	2.85	3.35	-0.50	
Sunshine 4 SW	6930	.36	1.94	.18	.54	.52	0.45	2.37	-0.09	7.68	7.75	-0.07	
Thermopolis	4336	.02	.30	.06	.80	.72	0.52	2.55	+0.53	4.97	5.88	-0.91	
Riverton	4954	.16	.14	.06	.56	.42	0.23	1.89	+0.59	3.46	4.03	-0.57	
Dubois	6917	.03	.39	.41	.42	.13	0.37	1.66	+0.61	3.41	4.06	-0.65	
Average		.08	.47	.13	.26	.47	0.35	1.90	+0.40	4.22	4.67	-0.45	
<u>TONGUE RIVER BASIN</u>													
Sheridan	4021	.22	.27	.50	1.14	1.53	0.77	1.53	-0.39	5.96	6.97	-1.01	
<u>POWDER RIVER BASIN</u>													
Arvada	3680	.19	.19	.65	.69	.53	0.28	1.18	-0.08	3.71	4.62	-0.91	
Metz Ranch	5280	.02	.04	.23	.40	.91	0.27	1.16	-0.43	3.03	5.05	-2.02	
Gillette	4542	.18	.70	.86	.62	.94	T	2.40	+0.65	5.70	6.21	-0.51	
Nine Mile Creek	5000	.10	.40	.27	1.13	.94	0.56	1.58	-0.18	4.98	4.98	0.00	
Mid-West	4850	.10	1.02	.12	.74	2.78	0.23	2.01	+0.32	7.00	6.09	+0.91	
Average		.12	.47	.43	.61	1.22	0.20	1.67	+0.07	4.88	5.39	-0.51	



MONTANA SNOW SURVEYS May 1, 1953

MISSOURI BASIN

Drainage Basin & Snow Course *	No.	Elev.	Date of Survey 1953	Snow Depth (In.) 1953	May 1 1953	Water Content (Inches)						Y e a r s
						Past Records				Average Data May 1		
						1952	1951	1950	1949	Avg.	% Avg.	
<u>JEFFERSON RIVER</u>												
(Rock-Beaverhead)												
Lakeview Ridge	11E3	7400	4/30	23	7.6	10.6	4.9	-	2.4	5.9	129	5
Lakeview Canyon	11E4	6930	4/30	34	11.7	17.9	8.2	-	2.2	9.4	124	5
(Wise River)												
Elk Horn	13D15	8450	5/1	31	10.2	3.8	-	10.7	5.5	5.5	186	11
<u>MADISON RIVER</u>												
Hebgen	11E5	6550	4/28	16	6.2	7.2	0	8.4	1.2	2.8	222	20
West Yellowstone	11E7	6700	4/28	14	5.8	6.8	5.1	10.0	4.4	3.7	157	20
21-Mile	11E6	7150	4/29	36	12.5	16.1	12.5	18.8	12.6	10.6	118	20
*Big Springs	11E9	6500										
<u>GALLATIN RIVER</u>												
Devil's Slide	10D4	8100	5/2	63	23.3	25.6	18.7	24.5	20.3	21.4	109	19
Hood Meadow	10D3	6600	5/2	16	5.2	2.5	5.5	8.5	1.7	4.2	124	19
21-Mile	11E6	7150	4/29	36	12.5	16.1	12.5	18.8	12.6	10.6	118	20



MONTANA RIVER SURVEYS May 1, 1953

MISSOURI BASIN

Drainage Basin & Snow Course *	No.	Elev.	Date of Survey 1953	Snow Depth (In.) 1953	May 1 1953	Water Content (Inches)						Y e a r s
						Past Records				Average Data		
										May 1		
						1952	1951	1950	1949	Avg.	%Avg.	
<u>MISSOURI RIVER MAIN STEM</u>												
Chessman Reservoir	12C5	6200	4/20	12	3.5	.00	3.0	7.8	.00	1.6	219	18
Kings Hill	10C1	7950	4/29	37	12.4	9.8	12.8	19.6	12.8	11.6	107	13
Pipestone Pass	12D1	7200	5/1	24	6.1	0.3	6.3	3.2	1.0	2.0	306	14
Stemple Pass	12C1	6900	4/30	31	8.8	4.2	11.2	14.2	6.3	5.9	149	19
Tenmile, Lower	12C2	6250	5/2	18	5.4	.00	5.1	8.9	0.2	2.0	270	18
Tenmile, Middle	12C3	6800	5/2	35	11.8	1.7	11.2	16.3	3.5	6.3	187	19
Tenmile, Upper	12C4	8000	5/2	44	16.2	5.9	14.8	18.8	7.1	10.2	159	18
(Marias River)												
Marias Pass	12B5	5250	4/30	45	17.4	10.5	19.7	26.3	12.1	9.9	176	19
<u>UPPER YELLOWSTONE</u>												
Canyon	10E3	7750	5/1	37	13.9	13.3	17.3	9.7	10.8	11.6	120	7
Cooke City	10D7	7400	5/1	17	5.4	3.2	6.2	6.1	3.6	4.9	110	9
Lake Camp	10E4	7850	5/1	20	6.5	7.9	6.2	11.9	7.6	7.8	83	8
Lodgepole, Wyoming	9E1	8200	5/1	31	11.3	6.9	14.8	-	9.9	8.6	132	16
Lupine	10E1	7300	5/1	26	9.0	0.0	-	10.2	-	3.6	250	



MONTANA SNOW SURVEYS May 1, 1953

MISSOURI BASIN

Drainage Basin & Snow Course *	No.	Elev.	Date of Survey	Snow Depth (In.)	May 1 1953	Water Content (Inches)						Average Data		Year
						Past Records				May 1				
						1952	1951	1950	1949	Avg.	%Avg.			
LOWER YELLOWSTONE														
(Wind River - above Div.Dam)														
Brooks Lake #3	10F2	9200	4/26	64	28.6	29.1	34.2	34.2	25.5	25.3	113	1953		
Burroughs Creek	9F6	8800	4/27	40	17.0	10.4	25.3	17.7	11.2	16.2	105	1953		
Du Noir	9F2	8750	4/28	19	6.3	2.5	11.6	11.7	2.1	6.9	91	1953		
Geyser Creek	9F3	8500	4/27	17	5.8	2.3	10.3	7.8	00	5.1	114	1953		
Little Warm	9F4	9500	4/27	49	19.0	17.8	28.1	26.2	17.3	22.4	85	1953		
Sheridan	9F1	7500	4/26	14	5.8	00	6.0	5.0	00	1.9	305	1953		
T-Cross Ranch	9F5	8000	4/27	14	5.5	5.3	7.7	6.2	00	3.6	153	1953		
Dinwoodie	9F10	10000	4/25	44	14.9	14.5	18.6	17.2	10.6	15.2	98	1953		
Dry Creek	9F9	9500	4/25	30	9.4	5.9	11.5	10.6	3.9	8.0	104	1953		
Hobbs Park	9G2	10000	5/2	47	11.9	26.8	25.8	30.3	21.3	26.0	46	1953		
Mosquito Park	9G3	9500	5/2	30	7.7	12.9	8.1	12.7	5.4	7.0	110	1953		
St. Lawrence	9F11	9000	4/30	17	5.1	9.3	6.9	10.3	4.8	7.8	65	1953		
Troust Creek	9G1	8400	5/2	21	4.7	8.5	00	1.5	00	2.5	188	1953		

POPO AGIE RIVER

Blue Ridge	8G2	9500	5/1	34	9.3	20.5	12.6	18.4	10.8	12.6	74	14		
Grannier Meadows	8G4	9000	5/1	31	9.7	20.1	12.0	23.1	13.2	14.0	69	17		
Sawmill Glade	8G1	8500	5/1	18	5.6	11.6	7.3	7.6	2.1	7.2	78	14		
South Pass	8G3	9000	5/1	33	10.2	20.7	15.8	25.3	14.3	14.8	69	14		



MONTANA SNOW SURVEYS May 1, 1953MISSOURI BASIN

Drainage Basin & Snow Course *	No.	Elev.	Date of Survey 1953	Snow Depth (In.) 1953	May 1 1953	Water Content (Inches)						Y e a r s
						Past Records				Average Data May 1		
						1952	1951	1950	1949	Avg.	%Avg.	
BIG HORN RIVER (Wyoming)												
Beavers Mill	9F8	8000	4/26	41	14.3	5.7	6.8	8.0	4.8	6.3	227	5
Owl Creek	8F1	8700	4/25	32	10.4	6.9	5.4	10.0	5.6	7.0	149	5
Ranger Creek	7E1	8800	5/1	28	7.3	5.2	6.2	8.4	6.7	6.4	114	17
Tensleep R.S.	7E3	8200	5/2	23	5.8	3.8	5.5	8.5	1.5	4.4	131	16
Wood River	9E7	8000	5/1	13	3.5	1.1	5.4	5.0	2.3	4.0	88	13
POWDER RIVER												
Sour Dough	6E1	8500	5/4	24	6.7	2.2	4.9	6.0	0.0	5.0	134	17
Muddy Pass	7E7	9700	5/4	30	10.0	7.1	7.4	9.5	-	8.0	125	4



MONTANA SNOW SURVEYS May 1, 1953

COLUMBIA BASIN

Drainage Basin & Snow Course	No.	Elev.	Date of Survey 1953	Snow Depth (In.) 1953	May 1 1953	Water Content (Inches)						e a r s
						Past Records				Average Data May 1		
						1952	1951	1950	1949	Avg.	%Avg.	
FLATHEAD RIVER												
Blue Bird	14A1	6800	4/30	105	45.5	34.9	41.4	53.7	36.7	36.1	129	15
Basin Creek	13B14	5000	4/26	00	00	00	2.1	-	-	-	-	3
Big Creek	13B3	6750	4/30	107	45.9	42.1	48.0	60.0	-	43.1	106	5
Brush Creek	14A4	5000	4/30	27	10.3	2.3	3.6	17.1	-	5.3	179	10
Cattle Queen	13A1	4700										
Covote Hill	13B11	4200	5/1	6	3.7	00	-	-	-	-	-	2
Desert Mountain	13A2	5600	5/2	36	13.3	7.9	14.8	21.7	10.8	10.1	131	17
Hell Roaring Div.	14A3	5700	5/1	69	30.2	25.3	24.0	37.4	26.7	26.7	114	12
Holbrook	14B13	4530	4/20	00	00	00	1.4	-	-	-	-	3
Logan Creek	14A5	4300	4/30	5	1.6	00	1.0	7.1	-	1.1	149	15
Marias Pass	13A5	5250	4/30	45	17.4	10.5	19.7	26.3	12.1	9.9	180	19
North Fork Jocko	13B7	6330	5/1	97	42.9	35.1	43.4	59.6	-	35.6	118	6
Quintonkon	13A13	3800	5/2	9	3.5	4.1	4.6	-	-	-	-	3
Rainy Lake	13B6	4300	5/1	Under water		00	00	10.2	T	-	-	7
Spotted Bear Mt.	13B2	7000	4/28	20	6.9	-	6.8	18.1	-	-	-	4
Strawberry Lake	13B10	6500	4/30	96	40.5	39.7	27.9	58.8	35.4	40.4	100	5
Trinkus Lake	13B1	6500	4/30	88	37.9	40.6	32.9	53.1	36.5	40.8	100	5
Trout Lake	13A12	3600	4/29	22	7.4	4.3	-	20.2	-	11.7	63	4
Twin Creeks	13B11	3580	4/29	00	00	00	00	-	-	-	-	3
Upper Holland Lake	13B5	7000	5/6	83	34.1	34.0	33.5	-	-	33.9	103	3

PEND ORIELLE

Baree Mt.	13B1	6000	5/1	101	42.2	37.6	40.4	68.1	51.1	39.8	106	17
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MONTANA SNOW SURVEYS May 1, 1953

COLUMBIA BASIN

Drainage Basin & Snow Course *	No.	Elev.	Date of Survey 1953	Snow Depth (In.) 1953	May 1 1953	Water Content (Inches)						Average Data May 1 Avg. %Avg.	e s r
						Past Records							
						1952	1951	1950	1949				
UPPER CLARK FORK													
Coyote Hill	13B11	4200	5/1	8	3.7	00	-	-	-	-	-	2	
Chessman Reservoir	12C5	6200	4/30	12	5.5	00	3.0	7.8	00	1.6	219	18	
Lubrecht Forest	13C8	5400	5/1	No snow		00	1.0	-	-	-	-	3	
North Fork Jocko	13B7	6330	5/1	97	42.9	35.1	43.4	59.6	-	35.6	118	6	
Pipestone Pass	12D1	7200	5/1	24	6.1	0.3	6.3	9.2	1.0	2.0	306	14	
Rainy Lake	13B6	4200	5/1	Under water		00	00	10.2	T	-	-	7	
Stemple Pass	13C1	6900	4/30	31	8.0	4.2	11.2	14.2	6.3	5.9	149	19	
Tennile, Lower	12C2	6250	5/2	18	5.4	00	5.1	8.9	0.2	2.0	270	18	
Tennile, Middle	12C3	6800	5/2	35	11.8	1.7	11.2	16.3	3.5	6.3	187	19	
Tennile, Upper	12C4	8000	5/2	44	16.2	5.9	14.8	18.8	7.1	10.2	150	18	
*Lookout	15B2	5250	5/1	70	29.8	25.9	27.5	45.1	21.4	22.6	131	17	



MONTANA SNOW SURVEYS May 1, 1953COLUMBIA BASIN

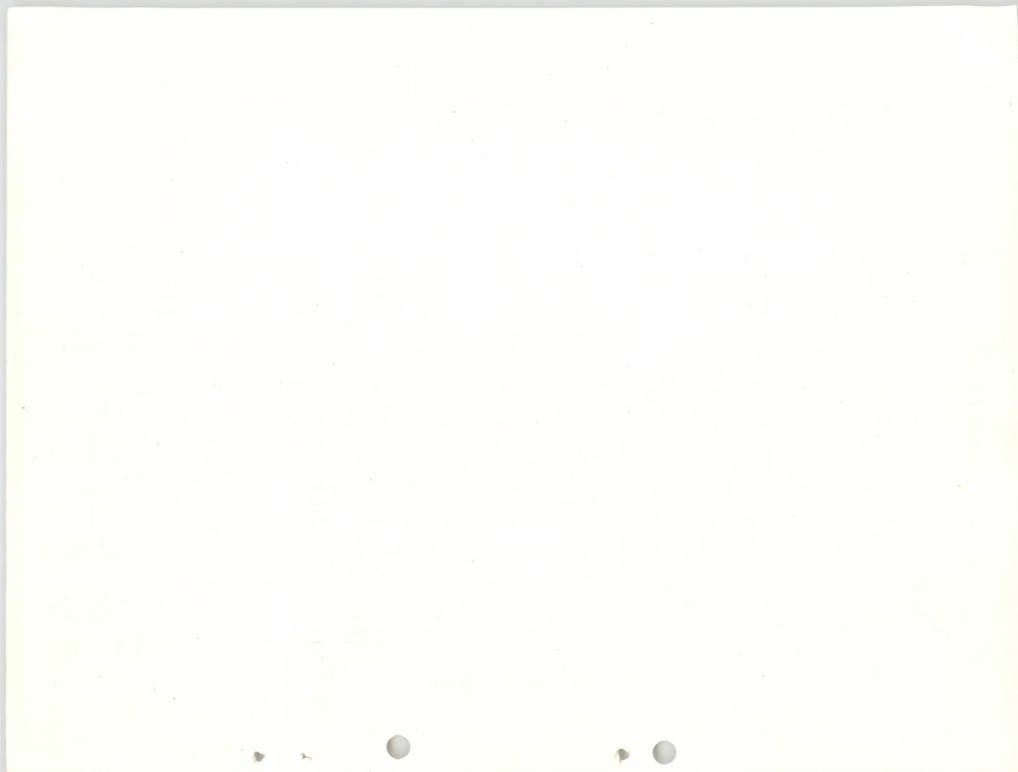
Drainage Basin & Snow Course *	No.	Elev.	Date of Survey 1953	Snow Depth (In.) 1953	May 1 1953	Water Content (Inches)					Y e a r s
						Past Records				Average Data	
						1952	1951	1950	1949	May 1	

KOOTENAI

Blue Bird	14A1	6800	4/30	105	45.5	34.9	44.4	53.7	36.7	36.1	127	15
Brush Creek	14A4	5000	4/30	27	10.3	2.3	8.6	17.1	-	5.8	179	10
Pernie	Canada	3500	4/30	15	3.8	00	2.1	7.7	00	2.3	160	7
New Fernie	Canada	4100	4/30	25	5.1	00	11.1	-	-	-	-	3
Marble Canyon	Canada	5000	4/30	35	14.7	7.3	19.1	16.7	10.2	13.1	112	6
Red Mt., Montana	15A1	6000	5/1	51	20.9	9.4	19.9	31.1	16.3	15.1	138	16
Sinclair Pass	Canada	4500	4/30	4	1.7	00	3.1	3.2	0.2	1.2	142	7
Sullivan Mine	Canada	5100	5/1	26	10.2	7.2	12.9	16.6	7.9	10.9	94	6
Gray Creek	Canada	5100	4/26	50	17.7	15.5	19.7	24.5	18.4	19.6	90	6

BITTERROOT

Gibbons Pass	13D2	7100	5/1	67	28.7	21.8	23.6	28.3	22.9	19.8	145	18
Nezperce Camp	14D2	5580	4/28	35	12.0	4.0	4.9	13.1	6.0	4.4	273	17
Nezperce Pass	14D1	6575	5/1	46	16.1	12.2	13.3	18.6	12.9	9.7	166	17
*Kit Carson	14D3	4700	5/1	5	1.1	-	-	2.2	-	0.5	220	11







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Furnishes the basic data
necessary for forecasting
water supply for irrigation,
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supply, hydro-electric power
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mining and industry

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